

Ecosystems: Terrestrial and Aquatic

5-2 Students will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems. (Life Science)

5-2.4 Identify the roles of organisms as they interact and depend on one another through food chains and food webs in an ecosystem, considering producers and consumers (herbivores, carnivores, and omnivores), decomposers (microorganisms, termites, worms, and fungi), predators and prey, and parasites and hosts.

Taxonomy level: 1.1-B Remember Conceptual Knowledge

Previous/Future knowledge: In 3rd grade (3-2.5), students summarized the organization of simple food chains (including the roles of producers, consumers, and decomposers). In 7th grade (7-4.2), students will illustrate the flow of energy in food chains, food webs and energy pyramids.

It is essential for students to know that all organisms need energy to live and grow. This energy is obtained from food. The role an organism serves in an ecosystem can be described by the way in which it gets its energy.

Producers

- Plants are called producers because they are able to use light energy from the Sun to produce food (sugar) from carbon dioxide in the air and water.

Consumers

- Animals cannot make their own food so they must eat plants and/or other animals.
- They are called consumers.
- There are three main groups of consumers.
 - Animals that eat only plants are called *herbivores*.
 - Animals that eat only animals are called *carnivores*.
 - Animals that eat both animals and plants are called *omnivores*.

Decomposers

- Consumers (including microorganisms, termites, worms, and fungi) that get the energy they need by breaking down dead or decaying matter.
- These decomposers speed up the decaying process that releases nutrients back into the food chain for use by plants.

One way to show how energy is passed through an ecosystem is through a food chain.

- A *food chain* is a series of plants and animals in which each organism is a source of food (energy) for the next in the series.
- In a typical food chain, plants use the Sun's energy to make their own food and then are eaten by one kind of animal which in turn is eaten by another kind of animal.
- Most organisms are part of more than one food chain and eat more than one kind of food in order to meet their energy requirements.
- Interconnected food chains form a *food web*.
- Most food chains have no more than six organisms.
- There cannot be too many links in a single food chain because the animals at the end of the chain would not get enough food (energy) to stay alive.

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- The role of an organism can be identified by its placement on the food chain.
- Decomposers are not typically noted on a food chain; they will break down any organism on the food chain when it dies.

An example of a grassland food chain:

Sun →	Grass →	Grasshopper →	Toad →	Snake →	Hawk →
	Producer	Consumer	Consumers		

Note that the arrows are drawn from *food source* → to *food consumer*

Organisms can also be identified based on how they interact with other organisms.

- *Predators* are animals that hunt and kill other animals for food.
- *Prey* are animals that are hunted and killed as food for other animals.
- A *parasite* is an organism that spends a significant portion of its life in or on a living *host* organism usually causing harm to the host without immediately killing it.
- *Hosts* are organisms or cells that serve as a home or a source of food for a parasite.

It is not essential for students to identify trophic levels found in a food chain or web, identify energy pyramids, or know other relationships between organisms (such as mutualism, commensalism, or symbiosis).

Assessment Guidelines:

The objective of this indicator is to *identify* roles of organisms in an ecosystem; therefore, the primary focus of assessment should be to recognize the roles of organism in a food chain or a food web. However, appropriate assessments should also require students to *recall* the roles of producers, consumers (including herbivores, carnivores, and omnivores), and decomposers; *recognize* from drawings or diagrams the components of a food chain or food web; or *recognize* the roles of predators and prey as well as parasites and host.